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27145-2**

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**Road vehicles — Implementation of
WWH-OBD communication
requirements —**

**Part 2:
Common emissions-related data
dictionary**

*Véhicules routiers — Mise en application des exigences de
communication WWH-OBD —*

Partie 2: Dictionnaire de données liées aux émissions communes



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote.
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years at which time it must either be transformed into an International Standard or be withdrawn.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/PAS 27145-2 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

ISO/PAS 27145 consists of the following parts, under the general title *Road vehicles — Implementation of WWH-OBD communication requirements*:

- *Part 1: General information and use case definition*
- *Part 2: Common emissions-related data dictionary*
- *Part 3: Common message dictionary*
- *Part 4: Connection between vehicle and test equipment*

NOTE ISO/PAS 27145-4 will be extended as necessary due to introduction of additional communication media.

Introduction

This document set includes the communication between the vehicle's OBD systems and test equipment implemented across vehicles within the scope of the WWH-OBD GTR (World Wide Harmonized On-Board Diagnostics Global Technical Regulations).

It has been established in order to apply the unified diagnostic services (specified in ISO 14229-1) to WWH OBD systems.

To achieve this, it is based on the Open Systems Interconnection (OSI) Basic Reference Model in accordance with ISO/IEC 7498-1 and ISO/IEC 10731, which structures communication systems into seven layers. When mapped on this model, the services specified by ISO/PAS 27145 are broken into:

- Application layer (layer 7), specified in ISO/PAS 27145-3;
- Presentation layer (layer 6), specified in ISO/PAS 27145-2;
- Session layer services (layer 5), specified in ISO/PAS 27145-4;
- Transport layer services (layer 4), specified in ISO/PAS 27145-4;
- Network layer services (layer 3), specified in ISO/PAS 27145-4;
- Data link layer (layer 2), specified in ISO/PAS 27145-4; and
- Physical layer (layer 1), specified in ISO/PAS 27145-4;

in accordance with Table 1.

Table 1 — Enhanced and legislated OBD diagnostic specifications applicable to the OSI layers

Applicability	OSI 7 layers	Implementation of WWH-OBD communication requirements, e.g. emissions-related UDS
Seven layers according to ISO/IEC 7498-1 and ISO/IEC 10731	Application (layer 7)	ISO/PAS 27145-3 / ISO 14229-1
	Presentation (layer 6)	ISO/PAS 27145-2
	Session (layer 5)	ISO/PAS 27145-4
	Transport (layer 4)	
	Network (layer 3)	
	Data link (layer 2)	
	Physical (layer 1)	

Road vehicles — Implementation of WWH-OBD communication requirements —

Part 2: Common emissions-related data dictionary

1 Scope

ISO/PAS 27145 is intended to become the single communication standard for access to OBD-related information. To allow for a smooth migration from the existing communication standards to this future worldwide standardized communication standard, the initial communication concept will be based on CAN. In a second step, ISO/PAS 27145 will be extended to define the world-wide harmonized OBD communication standard based on existing industry communications standards (e.g. Internet Protocol) over Ethernet. Due to the usage of standard network layer protocols, future extensions to optional physical layers (e.g. wireless) are possible.

This part of ISO/PAS 27145 defines all regulatory emissions-related data elements of ISO/PAS 27145. A new part may be added in the future upon availability of new legislated WWH-OBD GTR modules. The data elements are used to provide the external test equipment with the diagnostic status of the emissions-related system in the vehicle. All data elements are communicated with the unified diagnostic services as defined in ISO/PAS 27145-3. Data elements are Diagnostic Trouble Codes (DTCs), Parameter Identifiers (PIDs), Monitor Identifiers (MIDs), Test Identifiers (TIDs)/Routine Identifiers (RIDs) and InfoType Identifiers (ITIDs).

This part of ISO/PAS 27145 defines three (3) different sets of data elements:

- a) A legacy (backward compatible) data set as defined in SAE J1939-71/-73 and ISO 15031-5/ISO 15031-6;
- b) A unified data set (new data definition according to ISO/PAS 27145-2); and
- c) A manufacturer data set (defined by manufacturer).

Each set of data elements uses its own scaling and encoding scheme. Legacy data elements are scaled and encoded according to the definitions in SAE J1939-71/-73 and ISO 15031-5/ISO 15031-6. Unified data elements are scaled and encoded according to the definitions in ISO/PAS 27145-2. Manufacturer data elements are recommended to be scaled and encoded according to the definitions of the unified data set. This will ease the transfer of manufacturer defined data elements into the standardized (unified) data range.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7498-1, *Information technology — Open Systems Interconnection — Basic Reference Model — Part 1: The Basic Model*

ISO/IEC 10731, *Information technology — Open Systems Interconnection — Basic Reference Model — Conventions for the definition of OSI services*

ISO 14229-1, *Road vehicles — Unified diagnostic services (UDS) — Part 1: Specification and requirements*

ISO/TS 15031-2, *Road vehicles — Communication between vehicle and external equipment for emissions-related diagnostics — Part 2: Terms, definitions, abbreviations and acronyms*

ISO 15031-5, *Road vehicles — Communication between vehicle and external test equipment for emissions-related diagnostics — Part 5: Emissions-related diagnostic services*

ISO 15031-6, *Road vehicles — Communication between vehicle and external test equipment for emissions-related diagnostics — Part 6: Diagnostic trouble code definitions*

ISO/PAS 27145-1, *Road vehicles — Implementation of WWH-OBD communication requirements — Part 1: General information and use case definition*

ISO/PAS 27145-3, *Road vehicles — Implementation of WWH-OBD communication requirements — Part 3: Common message dictionary*

ISO/PAS 27145-4, *Road vehicles — Implementation of WWH-OBD communication requirements — Part 4: Connection between vehicle and test equipment*

SAE J1939-21, *Recommended Practice for a Serial Control and Communication Vehicle Network — Data link layer*

SAE J1939-71, *Recommended Practice for a Serial Control and Communication Vehicle Network — Vehicle application layer*

SAE J1939-73, *Recommended Practice for a Serial Control and Communication Vehicle Network — Application layer — Diagnostics*

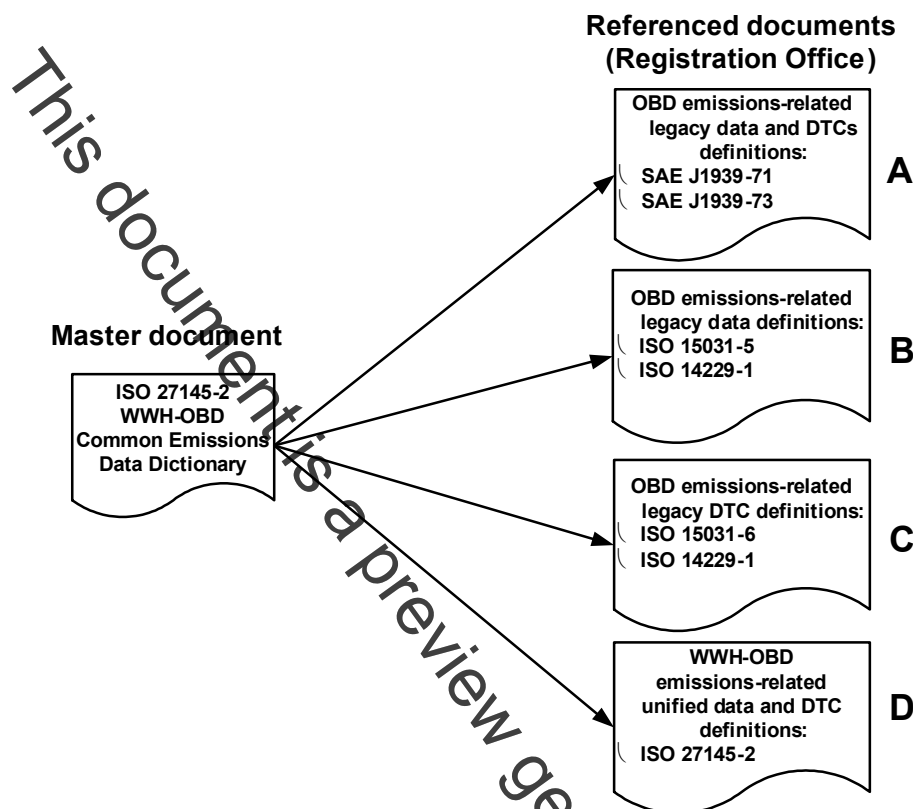
OBD_E_LDATA, *OBD emissions-related data definitions*

OBD_E_LDTC, *OBD emissions-related diagnostic trouble code definitions*

WWH-OBD_E_UDATA_UDTC, *WWH-OBD emissions-related unified data and DTC definitions*

Figure 1 — WWH-OBd external document reference concept illustrates a master document (ISO/PAS 27145-2) and the reference to existing standards (legacy emissions data and DTCs) as well as the reference to new documents which define the Unified Data Identifiers and Unified DTCs based on the requirements deriving from the WWH-OBd GTR.

The ISO/PAS 27145-2 referenced documents are available via download through a so-called Registration Office Web Site. See Clause 2 for referenced document file names.



Key

- A External document "SAE J1939-71 and SAE J1939-73" defines emissions-related SPNs, DTCs and PGNs.
- B External document "OBd emissions-related legacy data definitions" defines emissions-related data based on ISO 15031-5 and ISO 14229-1.
- C External document "OBd emissions-related legacy diagnostic trouble code definitions" defines emissions-related DTCs based on ISO 15031-5 and ISO 14229-1.
- D External document "WWH-OBd emissions-related Unified Data definitions" defines WWH-OBd emissions-related unified data identifiers and DTCs required by the WWH-OBd GTR.

Figure 1 — WWH-OBd external document reference concept

See Annex A for detailed document location and content description.